UNITED NATIONS

Framework Convention on Climate Change

Distr.
GENERAL

FCCC/CP/1996/5/Add.3
FCCC/SBSTA/1996/7/Add.3/Rev.1
17 May 1996

ORIGINAL: ENGLISH

CONFERENCE OF THE PARTIES
Second session
Geneva, 8-19 July 1996
Item 5 of the provisional agenda

SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE
Third session
Geneva, 9-16 July 1996
Item 3 of the provisional agenda

SCIENTIFIC ASSESSMENTS

CONSIDERATION OF THE SECOND ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Addendum

THE ECONOMIC AND SOCIAL DIMENSIONS OF CLIMATE CHANGE: CONTRIBUTION OF WORKING GROUP III OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Note by the secretariat

Revision

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I. INTRODUCTION

1. Working Group III (WG III) of the Intergovernmental Panel on Climate Change (IPCC) was restructured in 1992 and charged with conducting technical assessments of the socio-economic dimensions of impacts, adaptation and mitigation of climate change over both the short and the long term at the regional and global levels. Its work programme, approved by the IPCC in June 1993, consisted of two parts:

(a) An evaluation of emission scenarios to be completed in time for the 1994 Special Report of the IPCC; and

(b) An assessment of the literature on socio-economic issues related to climate change for the IPCC Second Assessment Report.

2. The mandate of WG III as given by the IPCC included the following:

> It will place the socio-economic perspectives of climate change in the context of sustainable development. In particular, and in accordance with the United Nations Framework Convention on Climate Change (UNFCCC), the work of WG III will be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors.

3. The Working Group was enjoined to assess available literature in these fields. It should give due recognition in its work to the Rio Declaration on Environment and Development, Agenda 21 and, in particular, the UNFCCC. It should not make policy judgements.

4. The writing teams were composed of economists and, to a lesser extent, social scientists and other experts. Each team included at least one expert from a developing country.

5. WG III sponsored workshops in Brazil, Italy, Japan and Kenya; each of these had a topical and regional component. WG III also contributed to the IPCC Workshop on Article 2 of the UNFCCC, held at Fortaleza, Brazil, in October 1994. The proceedings of the following workshops have been published:

- Policy Instruments and their Implications/Asia and the Pacific (Tsukuba, Japan, 13 to 20 January 1994)

- Equity and Social Considerations/Africa (Nairobi, Kenya, 18 to 22 July 1994)

II. OBSERVATIONS

6. The contribution of WG III to the Second Assessment Report consists of a Summary for Policymakers and 11 supporting chapters. Its report assesses a large part of the existing literature on the socio-economic issues related to climate change and identifies areas in which a consensus has emerged on key issues and areas where differences exist. According to the Summary for Policymakers, the chapters (see annex to the present note) have been arranged so that they cover several key issues; the order of the chapters, however, does not fully correspond to the order of the issues:

(a) First, frameworks for **socio-economic assessments of costs and benefits** of action and inaction are described. Particular attention is given to the applicability of cost-benefit analysis, the incorporation of equity and social considerations, and consideration of intergenerational equity issues (chapters 1, 2, 3, 4, 5 and 10);

(b) Second, the economic and social **benefits** of limiting greenhouse gas emissions and enhancing sinks are reviewed (chapter 6);

(c) Third, the economic, social and environmental **costs** of mitigating greenhouse gases are assessed (chapters 8 and 9);

(d) Fourth, generic **mitigation and adaptation response options** are assessed and the costs and effectiveness of different response options are summarized (chapter 7);

(e) Finally, the report provides an **economic assessment of policy instruments** to combat climate change (chapter 11).

7. The assessment of the literature on the socio-economic issues related to climate change focuses on the economic literature; material from other social sciences will be found mostly in chapter 3 on equity and social considerations.

8. The literature on socio-economic aspects of climate change is in several areas very controversial. Value judgements and policy preferences may largely determine which scientific approaches will be followed or rejected. In this regard, WG III notes that it provides an assessment of the current state of knowledge -- what we know and do not know -- and not a prescription for policy consideration.

Annex

IPCC WORKING GROUP III: TABLES OF CONTENTS OF THE SUPPORTING CHAPTERS*

Chapter 1. Introduction: Scope of the assessment (73 pages)

Summary
1.1 Introduction
1.2 Features of the climate change
1.3 Contribution of economics
1.4 Equity
1.5 Economics of policy actions
1.6 Sustainable development
Endnotes
References

This chapter is an introduction to the contribution of Working Group III to the Second Assessment Report. It describes the general characteristics of climate change, the possible contributions of economics in addressing the problem, and general issues such as equity, the economics of policy actions, and sustainable development.

Chapter 2. Decision-making frameworks for addressing climate change (32 pages)

Summary
2.1 Introduction
2.2 The context for climate change decision-making
2.3 Quantitative models of decision-making
2.4 Implications for national decision-making frameworks under the UNFCCC
Endnotes
References

This chapter discusses possible decision-making frameworks related to climate change. It describes and reviews the theoretical literature concerning decision-making, indicating how different frameworks can lead to different conclusions. It outlines several different frameworks such as global optimization, sequential decision-making, the decision-making process (how decisions are made), and collective decision-making (a framework for negotiating decisions).

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* Titles of chapters and subheadings are listed as given in the IPCC Second Assessment Report.

Chapter 3. Equity and social considerations (99 pages)

Summary
3.1 Introduction
3.2 Equity in international law and in the UNFCCC
3.3 Principal differences among regions and countries
3.4 Distributing the costs of coping: Impacts, risks and international insurance
3.5 Distributing future emissions and abatement costs
3.6 Equity within countries
3.7 Procedural fairness in international climate change processes
3.8 Conclusions
Endnotes
References

The chapter begins by reviewing concepts of equity and issues that must be considered in efforts to apply these concepts. It then looks at these broad concepts within the tradition of international law and the specific context of the UNFCCC and considers several ways in which this text assigns specific meaning to equity. It also analyses in detail several specific aspects of equity: international equity in coping with the impacts of climate change and associated risks, international equity in efforts to limit climate change, equity and social considerations within countries, and equity in international processes.

Chapter 4. Intertemporal equity, discounting, and economic efficiency (39 pages)

Summary
4.1 Introduction
4.2 Building blocks of the analytical approach
4.3 Perspective approach
4.4 Descriptive approach
4.5 Conclusion: Reconciling the two approaches
Endnotes
References

This chapter considers methods for comparing costs and benefits that arise at different times, especially where trade-offs occur across generations, and how these trade-offs involve issues of intertemporal equity. The topic raises questions of ethics and morals, because it involves reaching judgements about what is fair or just, and also of economics, because comparisons across time are necessarily judged in the light of changing standards of living over time, opportunities for productive investment, and trade-offs across generations.

Chapter 5. Applicability of techniques of cost-benefit analysis to climate change (47 pages)

Summary
5.1 Introduction
5.2 Cost-benefit analysis
5.3 Unique features of climate change
5.4 Cost-benefit analysis in the context of climate change
5.5 Issues
5.6 Conclusion
Endnotes
References

The objective of this chapter is to examine how and under what circumstances cost-benefit analysis can make a contribution to the resolution of the central questions now facing decision-makers about global climate change and the reduction of emissions. After cost-benefit analysis has been defined and put into the context of the unique features of climate change, key issues such as risk uncertainty, irreversibility, valuation, discounting, equity and multiple criteria are discussed.

Chapter 6. The social costs of climate change: Greenhouse damage and the benefits of control (92 pages)

Summary
6.1 Conceptual framework
6.2 Damage estimates for benchmark warming (2 x CO_2)
6.3 Damage estimates for longer-term warming
6.4 Climate catastrophes and surprises
6.5 Regional implications of climate change
6.6 From greenhouse damages to abatement benefits
6.7 The secondary benefits of abatement strategies
6.8 Conclusions
Endnotes
References

This chapter deals with the nature of damages caused by climate change. Damages here refer to the consequences of climate change for individuals and social welfare from an economics point of view. The chapter assesses the possible aggregate scale, the geographic distribution, and the nature of those damages. It raises certain issues relating to decision-making rules, since alternative ethical approaches to harm done to future generations have implications for damage assessment.

Chapter 7. A generic assessment of response options (59 pages)

Summary
7.1 Introduction
7.2 A contextual framework
7.3 Criteria for assessment
7.4 Mitigation options
7.5 Adaptation options
7.6 An integrated approach
7.7 Regional differences and international cooperation
Endnotes
References

This chapter surveys the set of response options feasible from an economic perspective in order to assess the scope and priorities of policies. Mitigation and adaptation options are reviewed in terms of applicability, cost-effectiveness, and social acceptability. The scope for integrated response options is evaluated and an analysis is presented of the extent to which various options may provide a basis for international policy cooperation.

Chapter 8. Estimating the cost of mitigating greenhouse gases (52 pages)

Summary
8.0 Introduction
8.1 Costs: Definition and determinants
8.2 Patterns of development and technological change
8.3 Differences among models and their results
Endnotes
References

This chapter presents a discussion of the critical determinants likely to influence the overall cost of climate policies and of the main methodologies employed to arrive at them. It examines the various concepts of costs used in the literature; the relationship between cost assessment and assumptions about development patterns and technical change that underlie any economic scenario used to assess mitigation costs. It also reviews the main methodological approaches for costing assessment, the key assumptions likely to determine the numerical result and the lessons derived from modelling debates in the energy field and in the forestry sector.

Chapter 9. A review of mitigation cost studies (119 pages)

Summary
9.1 Introduction
9.2 Review of existing studies of the costs of reducing CO_2 emissions

9.3 Studies of the costs of carbon sequestration
9.4 Studies of the costs of reducing non-energy GHG emissions
Endnotes
References

This chapter reviews, compares, and summarizes numerous recent studies of the costs of reducing greenhouse gas emissions and carbon sequestration.

Chapter 10. Integrated assessment of climate change: An overview and comparison of approaches and results (37 pages)

Summary
10.1 Introduction
10.2 Approaches to integrated assessment
10.3 Elements of an integrated assessment model
10.4 Overview of existing integrated assessment models
10.5 First results from integrated assessment models
10.6 Strengths and limitations of current integrated assessments
Endnotes
References

After defining integrated assessment and its purposes, the chapter discusses the different approaches to it. Elements of models for integrated assessment, the first results of these models and the challenges faced by them are reviewed.

Chapter 11. An economic assessment of policy instruments to combat climate change (72 pages)

Summary
11.1 Introduction
11.2 Greenhouse policy instruments and criteria for policy assessment
11.3 The domestic policy context
11.4 Regulations, voluntary agreements and other non-market based instruments
11.5 Market-based policy instruments
11.6 Policy implementation issues
11.7 Comparative assessment of greenhouse policy instruments
Endnotes
References

The aim of this chapter is to provide an economic assessment of possible policy instruments to manage greenhouse gas emissions. The factors affecting the policy mix for control of greenhouse gas emissions are reviewed, using guiding principles and taking into account the general international legal framework in which the Convention must operate.

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